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TRIVARIATE RESEARCH

IS NOW THE TIME TO BUY SEMICONDUCTORS?

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BACKGROUND AND RESEARCH CONCLUSIONS

Background: It is both consensus and prudent in our judgment to employ a barbell strategy when owning stocks. We recommend that investors own some defensive stocks with above average estimate achievability, and some higher-beta stocks with economic sensitivity. We previously studied which sectors outperformed in the three-months following the last twenty market sell-offs of ten percent or more. On average, **the best performing sector in these recoveries was Technology**. With that in mind, we investigate the Semiconductor industry in today's research as our suspicion is that Semiconductors are highly likely to outperform in a market recovery.

Constitution: Nvidia is more than 50% of the market cap of the Semiconductor industry. By company, 73% of all Semiconductor companies are growth stocks, and **less than 1% of Semiconductor market cap. is in the value universe today.** The percentage of companies that are in the highest quality quartile has declined over time, while the percentage in the junk bucket has grown such that **there are now more Junk Semis than High-Quality Semis!**

Revenue cycle: On a trailing revenue growth basis, the cycle appears to have bottomed and is accelerating, with the median company now showing positive trailing 12-month topline growth. However, the bottom-up consensus forecasts decelerating revenue growth, with China-exposure, Auto-demand, an Industrial slowdown, and high starting inventory among the issues that are likely to cause material downward sales revisions. The challenge is that while expectations might be too high in the next six-to-12 months, it seems clear that the long-term revenue growth of the Semiconductor industry will be higher over the next ten years than it was the previous ten years, owing to AI build-out and deployment. If you look at the top 20 Semiconductors by market cap., all but NXPI and ON are forecasted to have positive revenue growth over the next 12 months, and AMD, KLAC, MRVL, FSLR, and TER are forecasted to have higher growth in the next 12 months. TXN, LRCX, and other Technology companies so far this week have reported better than feared results and guidance.

BACKGROUND AND RESEARCH CONCLUSIONS

Gross margins forecasts too high?: Both trailing and forecasted gross margins oscillate, with the median forecast almost always well above the trailing gross margins. Interestingly the current gap is wide, implying that a material downside to gross margins is likely unless conditions change. Among the top 20 companies, AVGO, AMD, AMAT, ADI, KLAC, INTC, MU, MRVL, NXPI, MPWR, GFS, FSLR, TER, and ENTG are all forecasted to have higher gross margins. We will take the "under."

Operating expenses increasing: We looked at R&D-to-sales and SG&A-to-sales across the distribution of Semiconductor companies. R&D intensity appears to be rising across the board, now back up to average levels for the median and bottom quintile, but at 15-year highs for the top 20% of the companies. Twenty percent of Semiconductor companies have SG&A-to-sales of less than 10%, but the median company spends 16% of sales on these costs.

Net margins falling: We looked at the 20th, 50th, and 80th percentile of net and forecasted net margins over time for the Semiconductor industry. **Trailing net margins show that the bottom 20% of companies consistently LOSE money, but the analysts, except for during the Financial Crisis NEVER predict that they will.** According to bottom-up sell-side consensus forecasts, the median company will see the lowest net margins since COVID, which likely is true.

Inventory and capital spending: From our prior work, we know that *changes* in inventory-to-sales and *level* of capital intensity are better predictors of returns than *level* of inventory-to-sales and *changes* in capital intensity. Across the distribution inventory has peaked, except for 20% of the companies. Capital intensity is relatively high for 20% of the businesses, with the median company at 5%. Only six of the biggest 20 companies have positive inventory accruals, but 12 out of 20 have higher capital intensity than they have averaged historically. Some companies have inconsistent metrics. For example, MCHP has high inventory-to-sales, but its inventory-to-sales isn't rising, and its capital intensity is low.

INVESTMENT CONCLUSIONS

Cycle performance: Through last Friday, the current Semiconductor industry pullback has already been the 4th worst drawdown since 1999 – trailing only the TMT bubble unwind, the long period before and through the Financial Crisis, and the period after the massive COVID inventory build up.

KEY CONCLUSION: The market is extremely anticipatory of fundamentals. On average, the Semiconductor stocks have bottomed nine months before the fundamentals have bottomed during the major cycles in the last 25 years. While the consensus numbers show a ripple up and down, it doesn't appear this cycle will truly bottom accelerate until Q3 of 2026. So, our best guess is we get some powerful moves higher and lower in the coming months, and if history is a guide, by year-end we can make a more aggressive overweight call as we anticipate YoY revenue growth acceleration 9 months forward by the end of this year. Buying now would be 17 months before this cycle troughs, according to consensus estimates, making this the most anticipatory ever. We see going from under-weight to market-weight as reasonable, but a big overweight appears premature in our judgment.

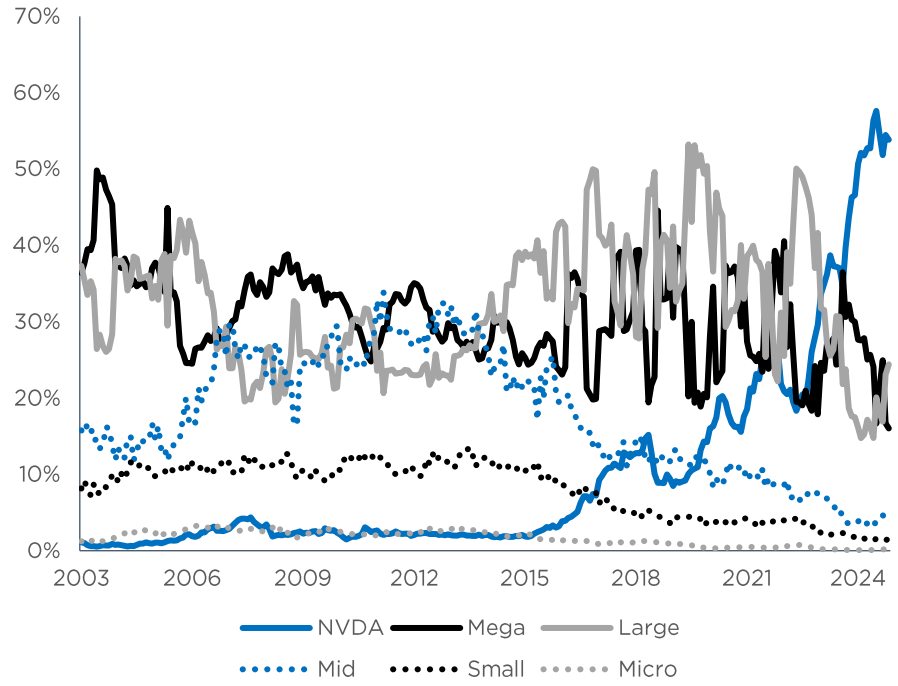
Factor efficacy: Over the last few years, buying companies with high gross margin forecasts and shorting those with low gross margin forecasts worked well for stock selection. Buying stocks with low capital spending-to-depreciation and shorting those with high capital spending-to-depreciation has been highly efficacious since COVID. Companies in the highest tertile of forecasted gross margins and the lowest in capital spending-to-depreciation are AVGO, ADI, and MCHP. Those that are forecasted to have poor gross margins and have a higher capital spending-to-depreciation are ON, SWKS, and WOLF. Valuation is not effective for picking winners from losers in Semiconductors (see slides 24 and 26).

AI and China: We created custom AI and China baskets by using natural language processing of earnings calls transcripts. Our custom AI basket (Slide 20) no longer shows a significant difference in forecasted revenue growth for the median stock, after a strong relative differential from May 2023 through August 2024. After massive outperformance by the AI-related Semiconductors, the recent drawdown has also been sharper. The non-AI Semiconductors on average are down in absolute terms since the beginning of 2023! Our China basket (Slide 22) is based on transcript mentions of China. Surprisingly, the performance of high vs. zero China mentions YTD is negligible.

NVDA IS MORE THAN HALF OF THE MARKET CAP, THERE IS NO VALUE

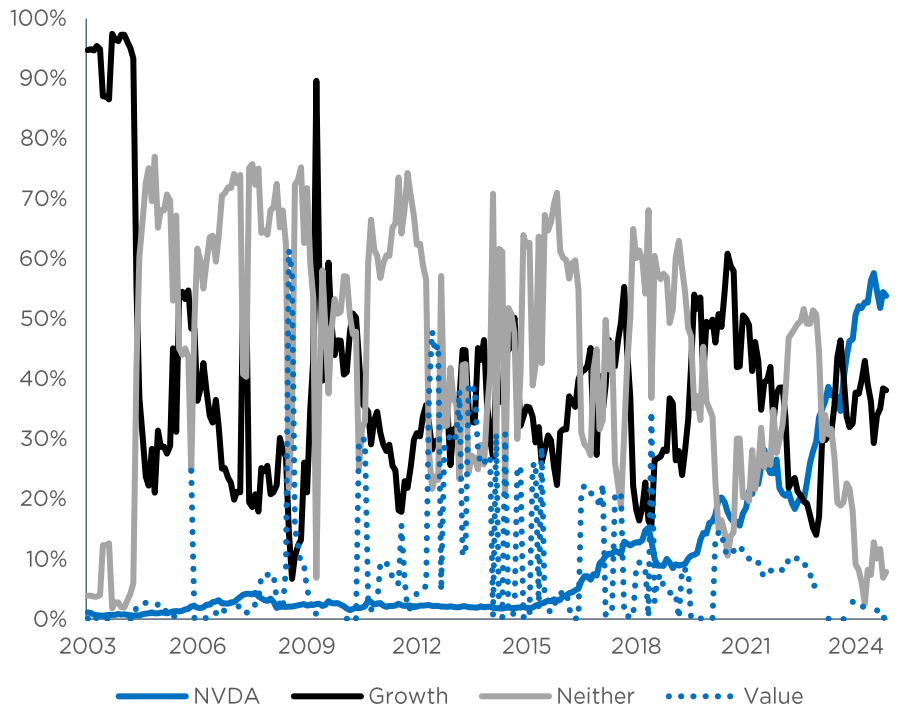
Nvidia is more than 50% of the market cap of the Semiconductor industry (left). Hence, when we discuss the percentage of market-cap. or any cap-weighted metrics it will be heavily influenced by NVDA-related data. For instance, NVDA is now bigger than all the other growth Semiconductors combined (right). In terms of style, less than 1% of Semiconductor market cap. is in the value universe today.

% Market Cap. of Semiconductor Stocks by Market Cap. Bucket
Through End-March, 2025



Source: Trivariate Research

% Market Cap. of Semiconductor Stocks by Style
Through End-March, 2025

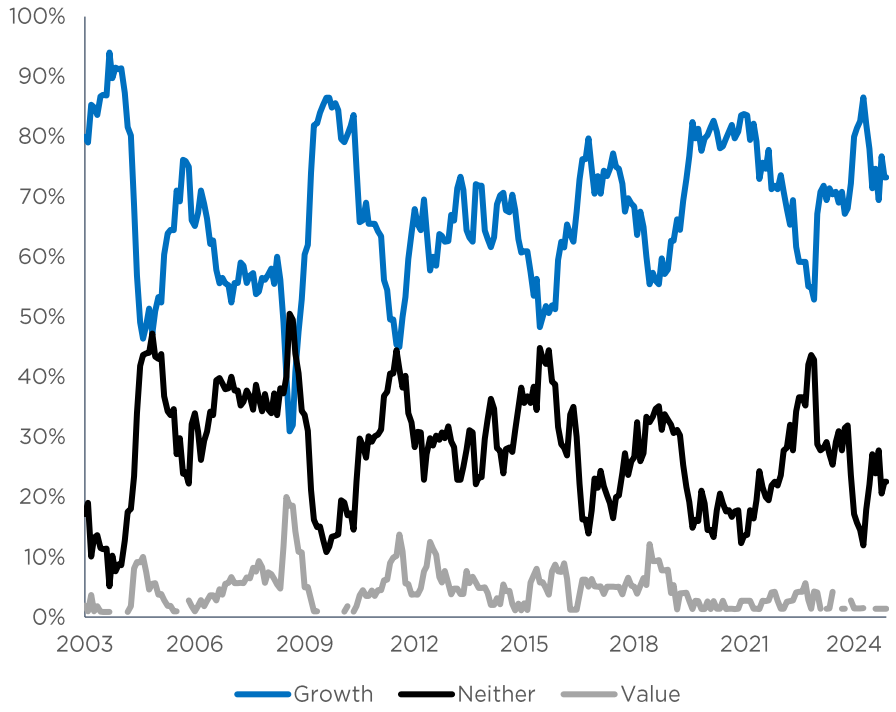


Source: Trivariate Research

THERE ARE NOW MORE JUNK THAN HIGH-QUALITY SEMICONDUCTORS

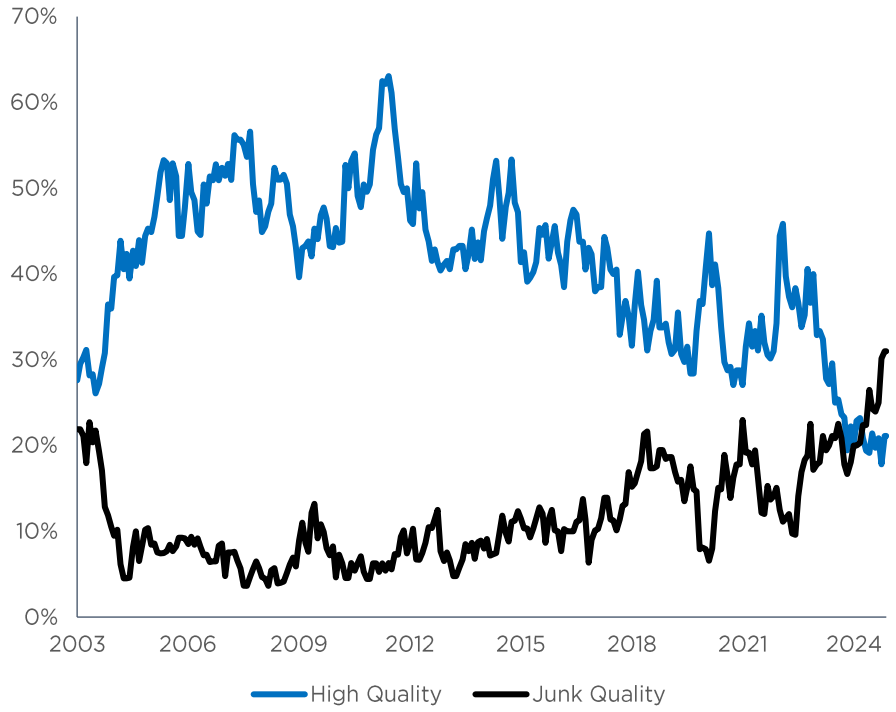
On a company basis, 73% of all Semiconductor companies are growth stocks, and 23% are in the middle ground we call Neither, with only 4% value (left). Interestingly, the percentage of Semiconductor companies that are in the highest quality quartile has declined over time, while the percentage in the junk bucket has grown (right). There are now more Junk Semis than High-Quality Semis!

Percentage of Semiconductor Stocks by Style
Through April 17th, 2025



Source: Trivariate Research

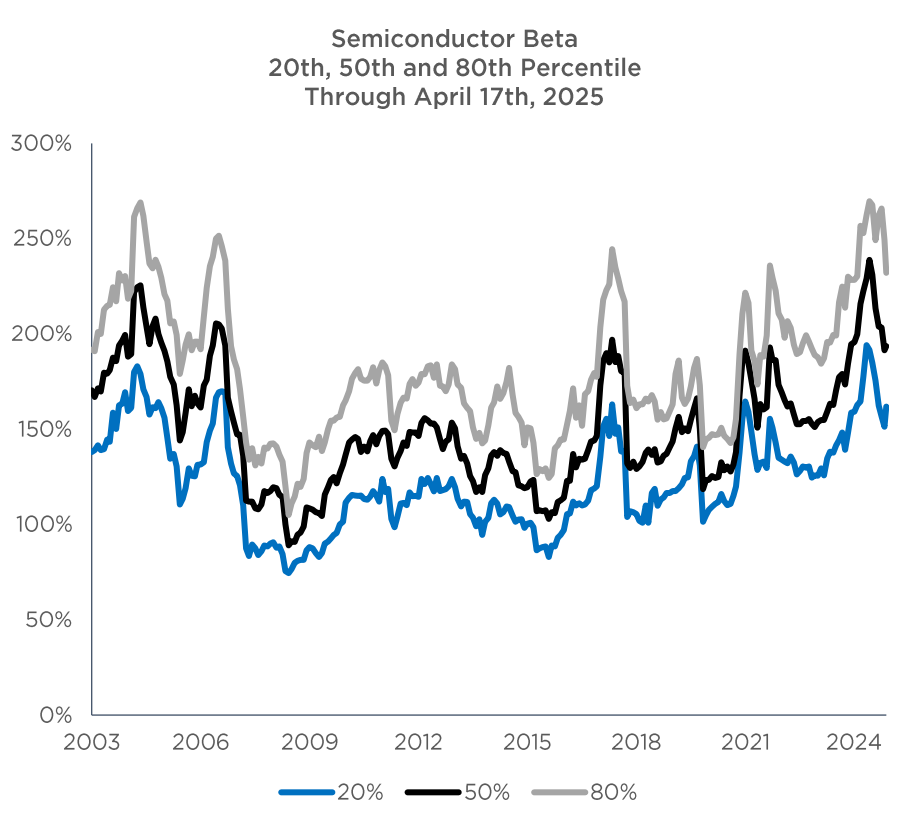
Percentage of Semiconductor Stocks by Substance
Through April 17th, 2025



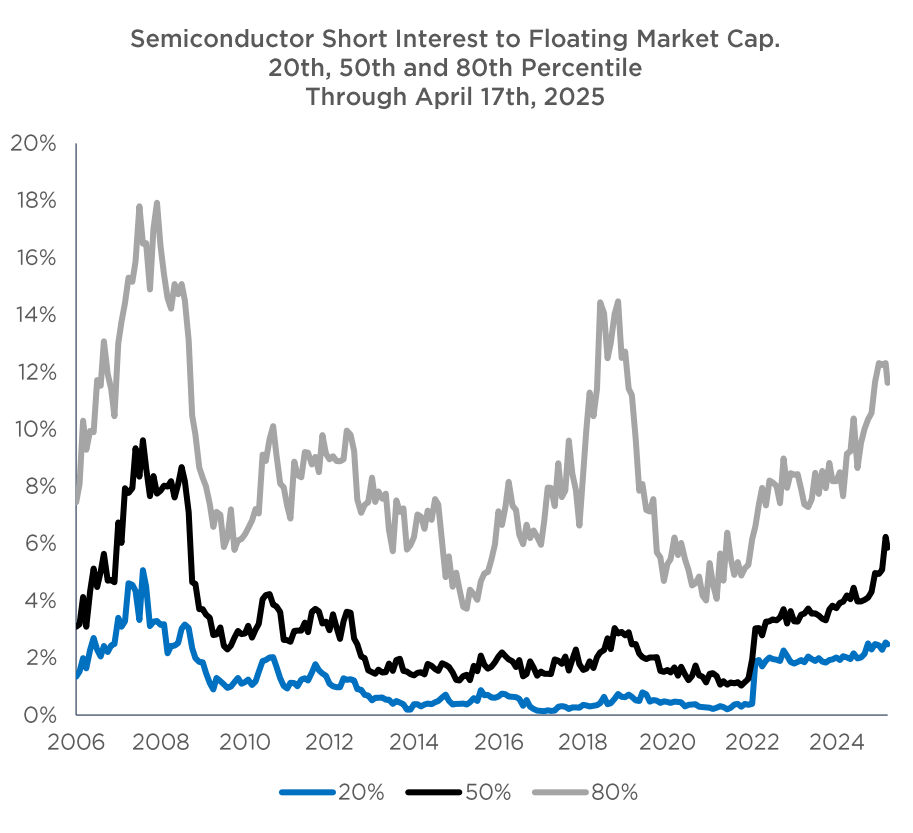
Source: Trivariate Research

BETAS HAVE SHARPLY DECLINED BUT HAVE MORE TO GO, SI IS HIGH

We pointed out in December of last year that the distribution of betas was incredibly high. The sharp relative to market correction in Semiconductors has brought the betas lower but they likely have further to decline (left). The further decline relative to the market this month makes these betas about 10% lower across the distribution than the end-March data points. Short interest across the distribution of Semiconductor stocks is incredibly high, with 20% of all Semiconductors now having more than 11.5% short interest (right).`



Source: Trivariate Research

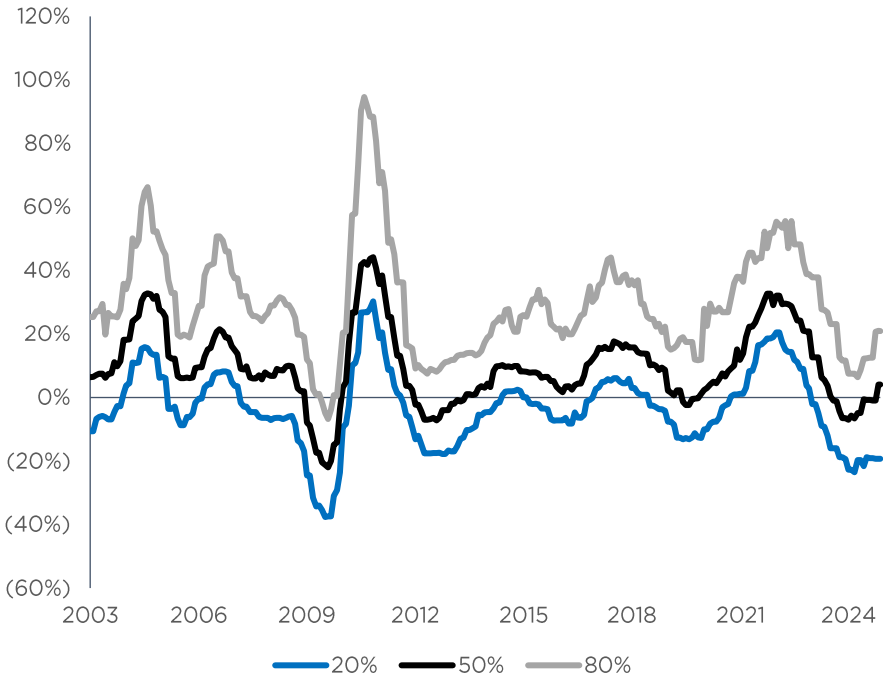


Source: Trivariate Research

FORECASTED REVENUE GROWTH IS LIKELY WAY TOO HIGH

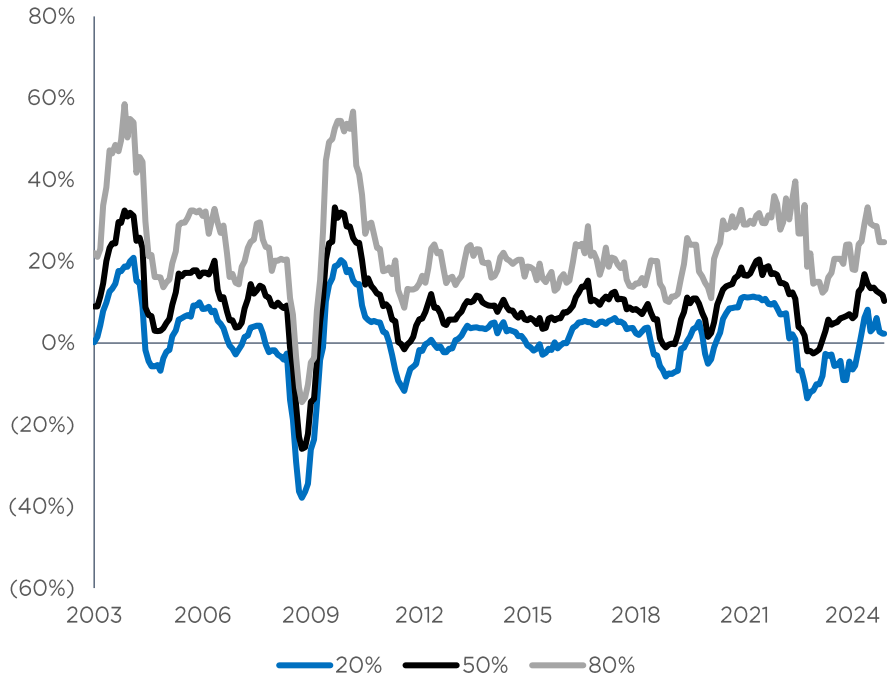
On a trailing revenue growth basis, the cycle appears to have bottomed and is accelerating, with the median company now showing positive trailing 12-month topline growth (left). The bottom-up consensus forecasts decelerating revenue growth (right), with China-exposure, Auto-demand, an Industrial slowdown, and high starting inventory among the issues that are likely to cause material downward sales revisions.

Semiconductor Revenue Growth
20th, 50th and 80th Percentile
Through April 17th, 2025



Source: Trivariate Research

Semiconductor Forecast Revenue Growth
20th, 50th and 80th Percentile
Through April 17th, 2025



Source: Trivariate Research

ANALYST OPTIMISM ON REVENUE GROWTH SEEMS EXCESSIVE

Analysts rarely forecast the amplitude of cyclicality that is realized in the Semiconductor industry, and trailing growth is still rising today. That means a downside revenue surprise is likely (left). The challenge is that while expectations might be materially too high in the next six-to-12 months, it seems clear that the long-term revenue growth of the Semiconductor industry will be higher over the next ten years than it was in the previous ten years, owing to AI build-out and deployment. If you look at the top 20 Semiconductors by market cap., all but NXPI and ON are forecasted to have positive revenue growth over the next 12 months, and AMD, KLAC, MRVL, FSLR, and TER are forecasted to have higher growth in the next 12 months.

Semiconductors Median Trailing vs
Forecast Revenue Growth
Through April 17th, 2025

Source: Trivariate Research

Top 20 Semiconductor Stocks
As of April 17th, 2025

Ticker	Market Cap. ($Bn)	Revenue Growth	Forecast Revenue Growth
NVDA	2476.36	114.2%	53.9%
AVGO	803.99	40.3%	14.3%
QCOM	150.27	12.1%	7.4%
AMD	141.43	13.7%	23.2%
TXN	135.07	(10.7%)	8.6%
AMAT	111.68	4.3%	4.2%
ADI	87.43	(19.3%)	10.3%
KLAC	84.31	12.2%	13.9%
INTC	82.55	(2.1%)	0.5%
LRCX	81.85	13.2%	13.4%
MU	76.89	71.1%	25.3%
MRVL	44.78	4.7%	42.1%
NXPI	43.30	(5.0%)	(4.8%)
MPWR	25.06	21.2%	19.3%
MCHP	20.74	(44.3%)	(6.3%)
GFS	17.53	(8.7%)	4.3%
ON	14.60	(14.2%)	(15.6%)
FSLR	13.72	26.7%	31.4%
TER	11.46	5.4%	6.2%
ENTG	10.40	(8.0%)	5.4%

Source: Trivariate Research

THERE'S ALWAYS A FORECASTED VS. TRAILING MARGINS DISCONNECT

Gross margins and forecasted gross margins both oscillate for Semiconductor stocks, with the median forecast almost always well above the trailing gross margins (left). Interestingly though, the current gap is wide, implying that a material downside to gross margins is likely unless conditions change. Among the top 20 companies (right), AVGO, AMD, AMAT, ADI, KLAC, INTC, MU, MRVL, NXPI, MPWR, GFS, FSLR, TER, and ENTG are all forecasted to have higher gross margins. We will take the "under."

Semiconductors Median Trailing vs. Forecast Gross Margin
Through April 17th, 2025

Source: Trivariate Research

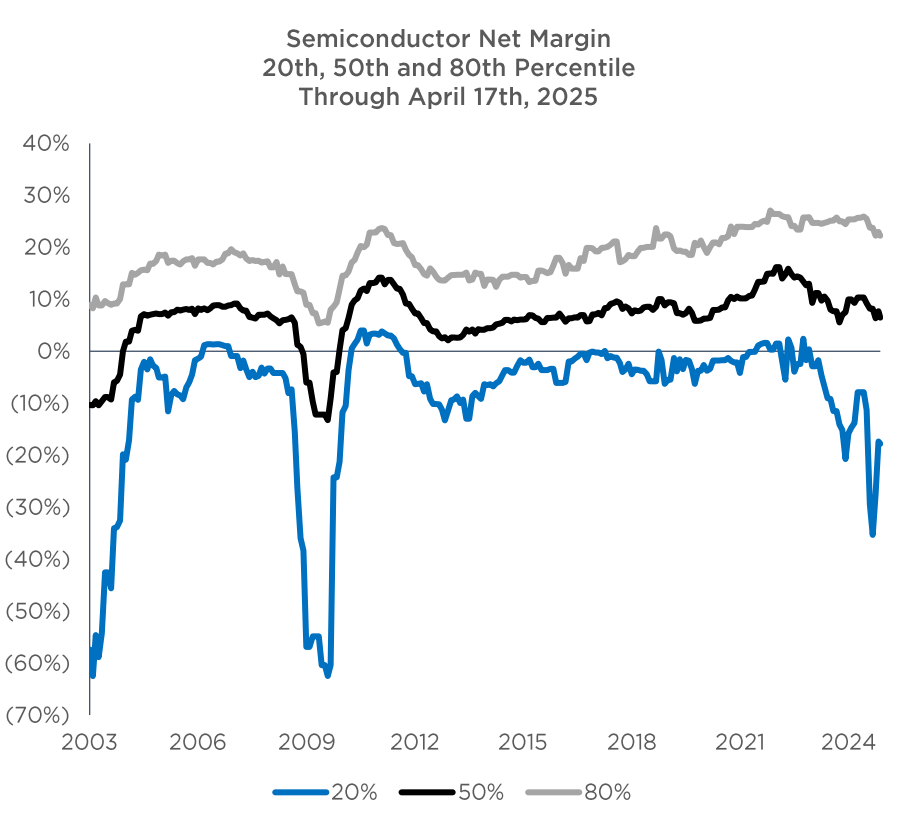
Top 20 Semiconductor Stocks
As of April 17th, 2025

Ticker	Market Cap. ($Bn)	Gross Margin	Forecast Gross Margin
NVDA	2476.36	75.0%	72.6%
AVGO	803.99	76.3%	78.4%
QCOM	150.27	56.0%	55.9%
AMD	141.43	53.0%	54.4%
TXN	135.07	58.1%	57.3%
AMAT	111.68	47.7%	48.3%
ADI	87.43	57.2%	69.4%
KLAC	84.31	59.7%	62.0%
INTC	82.55	33.0%	37.5%
LRCX	81.85	47.7%	47.6%
MU	76.89	34.7%	40.5%
MRVL	44.78	47.5%	60.0%
NXPI	43.30	56.7%	57.0%
MPWR	25.06	55.3%	55.9%
MCHP	20.74	58.0%	56.1%
GFS	17.53	24.5%	26.4%
ON	14.60	45.4%	40.1%
FSLR	13.72	44.2%	46.8%
TER	11.46	58.5%	59.5%
ENTG	10.40	45.9%	46.3%

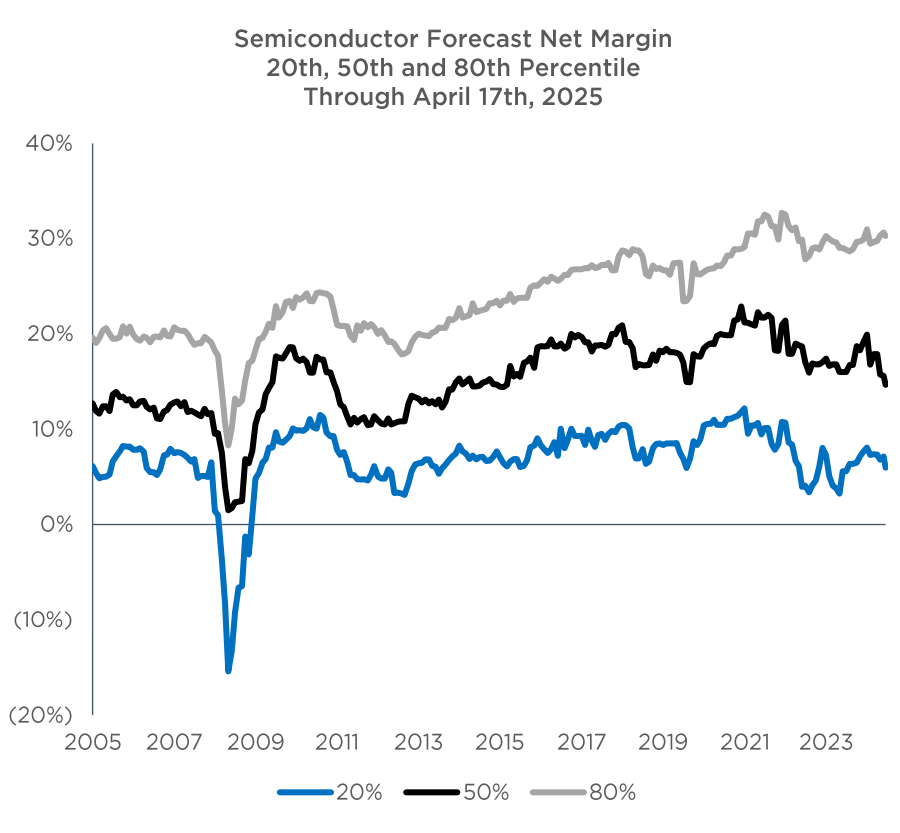
Source: Trivariate Research

FORECAST NET MARGINS HAVEN'T BEEN THIS LOW SINCE MAY 2020

We looked at the 20th, 50th, and 80th percentile of net margins (left) and forecasted net margins (right) for the Semiconductor industry. Trailing net margins show that the bottom 20% of companies consistently ACTUALLY lose money, but the sell-side analysts, except for during the Financial Crisis NEVER predict that they will (right). According to bottom-up sell-side consensus forecasts, the median company will see the lowest net margins since COVID, which likely is true.



Source: Trivariate Research



Source: Trivariate Research

LOSERS THAT ARE FORECASTED TO MAKE MONEY IN THE NEXT YEAR

Below are the Semiconductor companies with negative trailing net margins that are forecasted to have positive net margins over the next 12 months. Obviously, some of these are not really Semiconductor companies, and others, like Intel, have a new CEO who just announced they are firing 20% of the employees, so there can be company-specific reasons that profitability occurs, but in aggregate we think it is highly unlikely that all of these money-losing companies will turn profitable as macro conditions slow.

Semiconductor Stocks
With Negative Net Margin and Positive Forecast Net Margin
As of April 17th, 2025

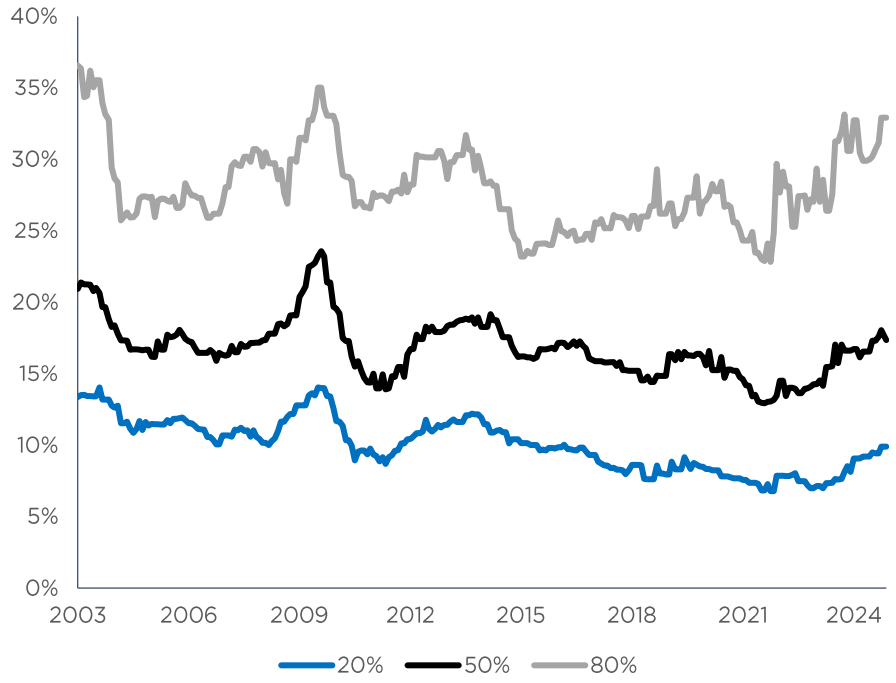
Ticker	Company	Market Cap. (US $Bil.)	Net Margin	Forecast Net Margin
INTC	Intel Corporation	82.55	(35.3%)	3.9%
MRVL	Marvell Technology, Inc.	44.78	(15.3%)	29.9%
GFS	GlobalFoundries Inc.	17.53	(3.9%)	13.5%
ALAB	Astera Labs, Inc.	9.56	(21.1%)	35.3%
MTSI	MACOM Technology Solutions Holdings, Inc.	7.23	(13.1%)	28.3%
ALGM	Allegro MicroSystems, Inc.	3.33	(8.5%)	10.9%
SITM	SiTime Corporation	3.06	(46.2%)	13.9%
SLAB	Silicon Laboratories Inc.	2.94	(32.7%)	3.1%
SMTC	Semtech Corporation	2.27	(17.8%)	14.3%
AMBA	Ambarella, Inc.	1.83	(41.1%)	0.1%
MXL	MaxLinear, Inc.	0.86	(68.0%)	7.4%
PENG	Penguin Solutions, Inc.	0.85	(0.4%)	7.9%
ICHR	Ichor Holdings, Ltd.	0.59	(2.5%)	5.2%
CEVA	CEVA, Inc.	0.55	(8.2%)	11.3%
SKYT	SkyWater Technology, Inc.	0.32	(2.0%)	0.3%

Source: Trivariate Research

OPERATING EXPENSES RELATIVE TO SALES ARE TRENDING HIGHER

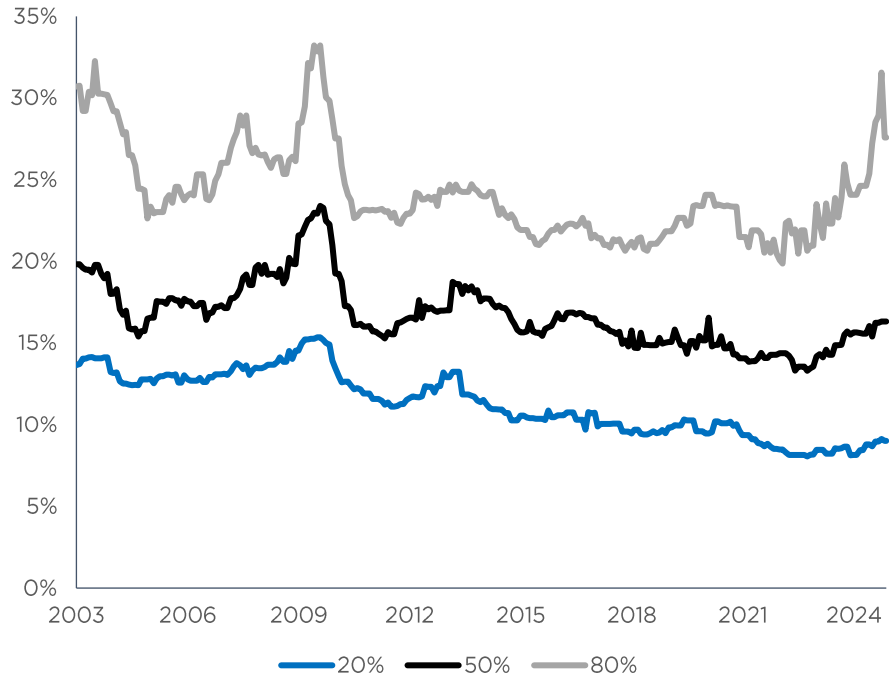
We looked at R&D-to-sales (left) and SG&A-to-sales (right) across the distribution of Semiconductor companies. R&D intensity appears to be rising across the board, now back up to average levels for the median and bottom quintile, but at 15-year highs for 20% of the companies. Twenty percent of Semiconductor companies have SG&A-to-sales of less than 10%, but the median company spends 16% of sales on these costs.

Semiconductor R&D-to-Sales
20th, 50th and 80th Percentile
Through April 17th, 2025



Source: Trivariate Research

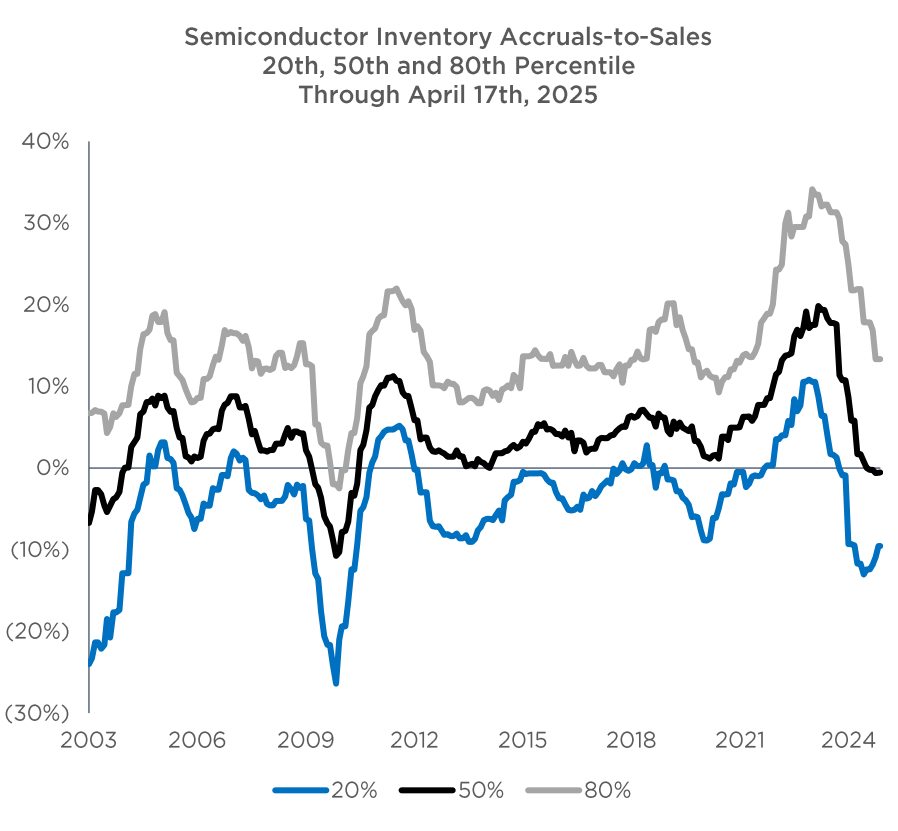
Semiconductor SG&A-to-Sales
20th, 50th and 80th Percentile
Through April 17th, 2025



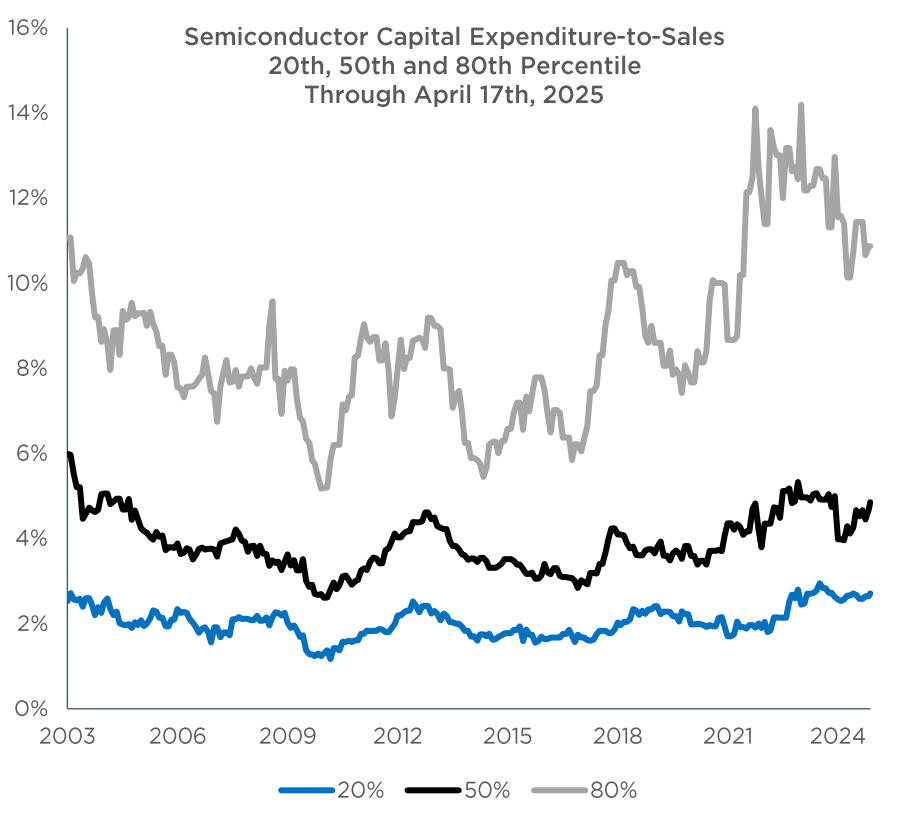
Source: Trivariate Research

INVENTORY ACCRUALS AND CAPITAL INTENSITY LEVEL MATTER

From our prior work, we know that *changes* in inventory-to-sales and *level* of capital intensity are better predictors of returns than *level* of inventory-to-sales and *changes* in capital intensity. As such we show the distribution of change in inventory-to-sales for the Semiconductor stocks on the left. Across the distribution inventory has peaked, except for 20% of the companies (left). Capital intensity is relatively high for 20% of the businesses, with the median company at 5% (right).



Source: Trivariate Research



Source: Trivariate Research

ONLY 6 OF THE TOP 20 STOCKS HAVE POSITIVE INVENTORY ACCRUALS

Generally, we want to avoid companies that have high inventory accruals AND high capital intensity. Only six of the biggest 20 Semiconductor companies have positive inventory accruals, but 12 out of 20 have higher capital intensity than they have historically had on average. Admittedly, some companies have inconsistent metrics. For example, MCHP has high inventory-to-sales, but it isn't getting worse and their capital intensity is low.

Top 20 Semiconductor Stocks
As of April 17th, 2025

Ticker	Inventory-to-Sales	% vs. History	Inventory Accruals-to-Sales	% vs. History	CapEx-to-Sales	% vs. History	R&D-to-Sales	% vs. History	SG&A-to-Sales	% vs. History
NVDA	26%	5%	11%	68%	2%	15%	10%	0%	3%	0%
AVGO	13%	1%	(0%)	20%	1%	0%	17%	56%	8%	55%
QCOM	54%	75%	(2%)	30%	3%	18%	22%	34%	7%	32%
AMD	75%	89%	9%	59%	2%	37%	25%	74%	11%	26%
TXN	113%	100%	13%	93%	31%	99%	13%	50%	11%	29%
AMAT	77%	55%	(3%)	28%	5%	85%	12%	33%	6%	20%
ADI	61%	89%	(8%)	6%	7%	85%	16%	14%	11%	22%
KLAC	99%	82%	5%	40%	3%	47%	12%	6%	9%	3%
INTC	86%	94%	(1%)	28%	45%	95%	31%	98%	10%	16%
LRCX	100%	88%	(11%)	16%	3%	62%	12%	30%	6%	9%
MU	112%	91%	6%	49%	40%	78%	11%	47%	4%	14%
MRVL	57%	84%	(5%)	18%	5%	69%	34%	67%	14%	66%
NXPI	76%	99%	4%	49%	6%	42%	18%	88%	9%	25%
MPWR	67%	55%	1%	17%	7%	52%	15%	9%	16%	10%
MCHP	132%	100%	0%	23%	3%	15%	20%	100%	13%	37%
GFS	89%	73%	14%	91%	9%	4%	7%	100%	6%	27%
ON	130%	100%	12%	74%	10%	77%	9%	42%	9%	12%
FSLR	86%	60%	32%	82%	36%	85%	5%	78%	6%	2%
TER	40%	54%	(5%)	27%	7%	67%	16%	61%	22%	84%
ENTG	75%	82%	(9%)	10%	10%	87%	10%	98%	14%	7%

Source: Trivariate Research

THIS IS ALREADY THE 4TH WORST DRAWDOWN IN 25 YEARS

While overly optimistic revenue and gross margin expectations, along with high inventory are all reasons to be bearish, the fact of the matter is the Semiconductor stocks have been harshly punished. This has already been the 4th worst drawdown since 1999 – trailing only the TMT bubble unwind, the long period before and through the Financial Crisis, and the period after the massive COVID inventory build up and interest rate tightening.

Semiconductor Stocks
Largest Selloff, Equal-Weighted and Subsequent Returns
1999 Through April 17th, 2025

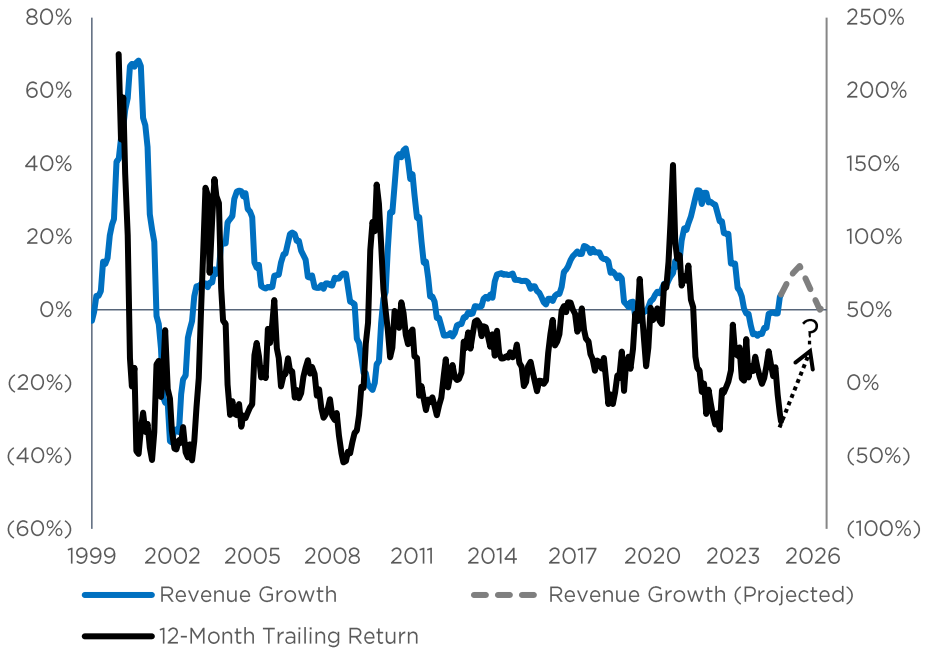
Drawdown	Duration (Month)	Start	End	1M Forward Return	3M Forward Return	6M Forward Return	12M Forward Return
(76.8%)	25	08/31/2000	09/30/2002	21.8%	34.7%	28.7%	133.5%
(64.4%)	61	01/30/2004	02/27/2009	16.2%	55.1%	91.5%	135.7%
(36.9%)	9	12/31/2021	09/30/2022	2.5%	7.7%	32.4%	24.2%
(33.0%)	10	06/28/2024					
(32.1%)	5	04/29/2011	09/30/2011	15.1%	8.8%	30.5%	16.2%
(28.0%)	3	07/31/2023	10/31/2023	15.3%	24.8%	28.5%	21.5%
(24.7%)	4	11/29/2002	03/31/2003	16.2%	46.1%	81.4%	123.0%
(20.8%)	4	08/31/2018	12/31/2018	13.1%	22.3%	32.1%	71.0%
(20.4%)	3	12/31/2019	03/31/2020	23.0%	38.6%	50.9%	149.1%
(20.0%)	3	02/29/2000	05/31/2000	29.1%	36.0%	(31.2%)	(20.4%)

Source: Trivariate Research

STOCKS BOTTOM NINE MONTHS BEFORE THE FUNDAMENTALS DO

Semiconductor revenue growth and stock performance look like a mirror during some regimes (left). The market is extremely anticipatory of fundamentals. If we take the bottom-up estimates, even if they are too high but have the same shape, revenue growth likely bottoms in Q3 of 2026. On average, stocks have bottomed 9 months before the fundamentals bottomed (right) during the last eight regimes. **Our conclusion is that it is too early to make an aggressive overweight call. We will likely see some rallies and declines this year, but this is closer to 17 months before the trough, which might be too early as it would be the most anticipatory rally ever.**

**Median Revenue Growth (Left) vs.
12-Month Trailing Return (Right)
Through April 17th, 2025**



Source: Trivariate Research

**Semiconductor Stocks
Biggest Revenue Growth Declines
1999 Through April 17th, 2025**

Peak	Trough	Trough Value	Decline	Gap Between Stock and Growth Trough
03/30/2001	06/28/2002	(36.3%)	(104.6%)	9
03/31/2005	12/30/2005	5.8%	(26.1%)	9
01/31/2007	12/31/2007	6.0%	(14.7%)	9
12/31/2008	12/31/2009	(22.0%)	(31.9%)	12
03/31/2011	08/31/2012	(7.0%)	(51.2%)	3
03/31/2015	06/30/2016	1.4%	(8.5%)	4
12/29/2017	12/31/2019	(3.1%)	(20.3%)	12
06/30/2022	04/30/2024	(6.5%)	(38.6%)	16
	09/30/2026 (Projected)			9 (Average)

Source: Trivariate Research

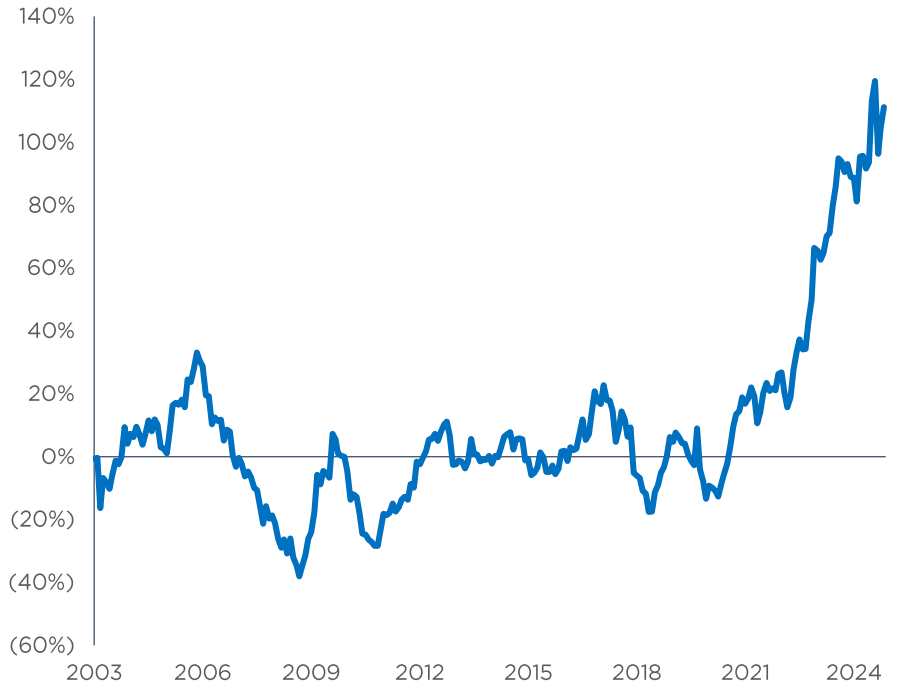
USE FORECASTED GMS AND DEPR-TO-COGS TO PICK STOCKS

We went into our factor library and evaluated the efficacy of over 200 signals to see which were efficacious for Semiconductor stock selection. Over the last few years, buying companies with high gross margin forecasts and shorting those with low gross margin forecasts worked well for stock selection (left). Paying attention to capital intensity matters, as buying stocks with low capital spending-to-depreciation and shorting those with high capital spending-to-depreciation has been highly efficacious since COVID (right).

Semiconductor Forecast Gross Margin
Cumulative Return of Q1 (High) - Q3 (Low)
Through April 17th, 2025

Source: Trivariate Research

Semiconductor Capex-to-Depreciation
Cumulative Return of Q1 (Low) - Q3 (High)
Through April 17th, 2025



Source: Trivariate Research

QUANTITATIVELY-DERIVED LONG AND SHORT IDEAS

Companies in the highest tertile of forecasted gross margins and the lowest in capital spending-to-depreciation are AVGO, ADI, and MCHP (left). Those that are forecasted to have poor gross margins and have a higher capital spending-to-depreciation are ON, SWKS, and WOLF. If these two metrics continue to work, the left side of the chart below are buy ideas, and the right side are sell ideas.

Semiconductor Stocks
Highest Tertile of Forecast Gross Margin
Lowest Tertile of CapEx-to-Depreciation
As of April 17th, 2025

Ticker	Company	Market Cap. ($Bn)	Forecast Gross Margin	CapEx-to-Depreciation
AVGO	Broadcom Inc.	803.99	78%	0.06
ADI	Analog Devices, Inc.	87.43	69%	0.87
MCHP	Microchip Technology Incorporated	20.74	56%	0.29

Source: Trivariate Research

Semiconductor Stocks
Lowest Tertile of Forecast Gross Margin
Highest Tertile of CapEx-to-Depreciation
As of April 17th, 2025

Ticker	Company	Market Cap. ($Bn)	Forecast Gross Margin	CapEx-to-Depreciation
ON	ON Semiconductor Corporation	14.60	40%	13.35
SWKS	Skyworks Solutions, Inc.	8.60	45%	217.25
WOLF	Wolfspeed, Inc.	0.38	16%	1091.59

Source: Trivariate Research

THE AI SEMICONDUCTOR BASKET

Below are the constituents in our AI Semiconductor basket as of mid-April 2025. We identified ten Semiconductor stocks whose recent earnings conference calls had the most mentions of "AI" related keywords. These words include phrases like LLM, GPU, and other phrases that indicate the company is focused on AI.

AI Semiconductor Basket Stocks
As of April 17th, 2025

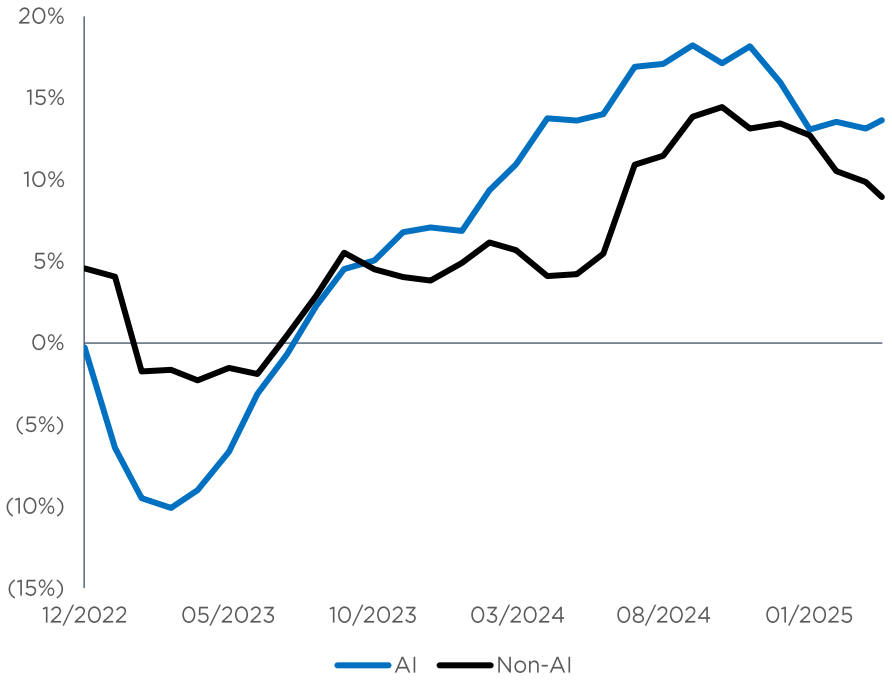
Ticker	Company	Sub-Industry	Market Cap. (US $Bil.)	Forecast Revenue Growth	Return Since 2023
NVDA	NVIDIA Corporation	Semiconductors	2476.36	53.9%	595.0%
AVGO	Broadcom Inc.	Semiconductors	803.99	14.3%	218.0%
QCOM	QUALCOMM Incorporated	Semiconductors	150.27	7.4%	30.9%
AMD	Advanced Micro Devices, Inc.	Semiconductors	141.43	23.2%	35.1%
AMAT	Applied Materials, Inc.	Semiconductor Materials & Equipment	111.68	4.2%	43.9%
KLAC	KLA Corporation	Semiconductor Materials & Equipment	84.31	13.9%	72.2%
LRCX	Lam Research Corporation	Semiconductor Materials & Equipment	81.85	13.4%	55.5%
MU	Micron Technology, Inc.	Semiconductors	76.89	25.3%	39.4%
TER	Teradyne, Inc.	Semiconductor Materials & Equipment	11.46	6.2%	(17.7%)
AOSL	Alpha and Omega Semiconductor Limited	Semiconductors	0.51	7.9%	(39.3%)

Source: Trivariate Research

AI SEMI VS OTHER SEMIS- REVENUE GROWTH IS NOT MUCH DIFFERENT

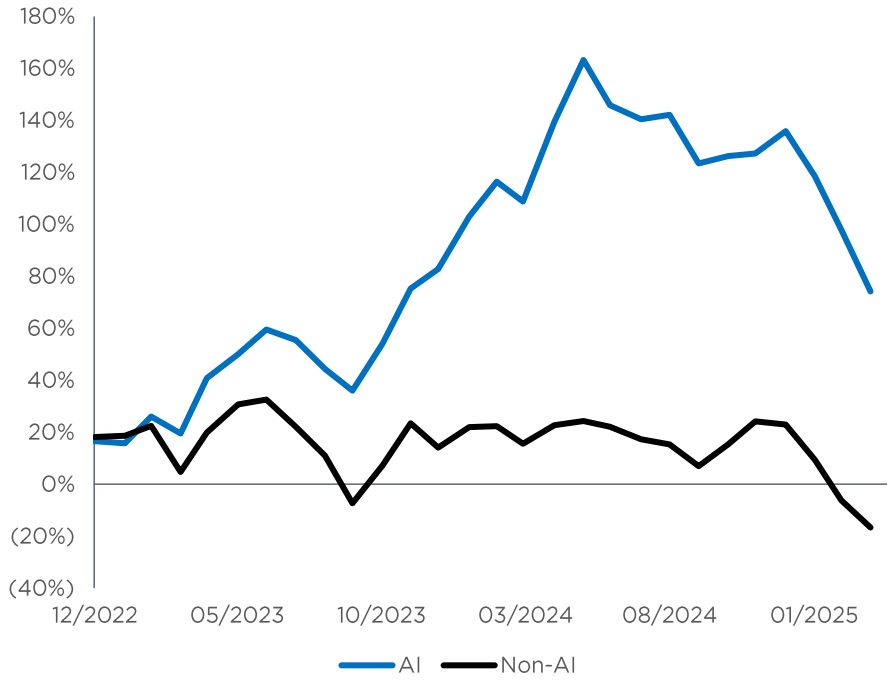
Interestingly, we no longer see a meaningful difference in forecasted revenue growth for the median stock, after a strong relative differential from May 2023 through August 2024 (left). After massive outperformance by the AI-related Semiconductors, the recent drawdown has also been sharper (right). Interestingly, the non-AI Semiconductors on average are down in absolute terms since the beginning of 2023 (right)!

Forecast Revenue Growth
AI Semi vs Non-AI Semi
Through April 17th, 2025



Source: Trivariate Research

Equal-Weight Cumulative Return
AI Semi vs Non-AI Semi
Through April 17th, 2025



Source: Trivariate Research

WE MADE A BASKET OF CHINA SEMIS USING TRANSCRIPT MENTIONS

We also use natural language processing to search all the Semiconductor earnings call transcripts for mentions of China. We show those with the most mentions (left), to include TXN, VECO, AMAT, and UCTT. On the right, we show some of the Semiconductor companies with zero mentions of China. Interestingly, some of these companies do have China revenue.

Semiconductor Stocks w/ Most Mentions of "China" in 2025 Earnings Call
As of April 17th, 2025

Ticker	Company	Report Date	Mentions	YTD Return
TXN	Texas Instruments Incorporated	2025-01-23	31	(20%)
VECO	Veeco Instruments Inc.	2025-02-12	30	(33%)
AMAT	Applied Materials, Inc.	2025-02-13	28	(15%)
UCTT	Ultra Clean Holdings, Inc.	2025-02-24	27	(48%)
ACLS	Axcelis Technologies, Inc.	2025-02-11	23	(36%)
NXPI	NXP Semiconductors N.V.	2025-02-04	22	(17%)
LRCX	Lam Research Corporation	2025-01-29	21	(11%)
ALGM	Allegro MicroSystems, Inc.	2025-01-30	21	(17%)
KLAC	KLA Corporation	2025-01-30	17	1%
ENTG	Entegris, Inc.	2025-02-06	17	(31%)
FSLR	First Solar, Inc.	2025-02-25	15	(27%)
QRVO	Qorvo, Inc.	2025-01-28	15	(18%)
QCOM	QUALCOMM Incorporated	2025-02-05	14	(11%)
GFS	GlobalFoundries Inc.	2025-02-11	12	(26%)
ON	ON Semiconductor Corporation	2025-02-10	12	(45%)
ACMR	ACM Research, Inc.	2025-02-26	11	28%

Source: Trivariate Research

Semiconductor Stocks w/ Zero Mention of "China" in 2025 Earnings Call
As of April 17th, 2025

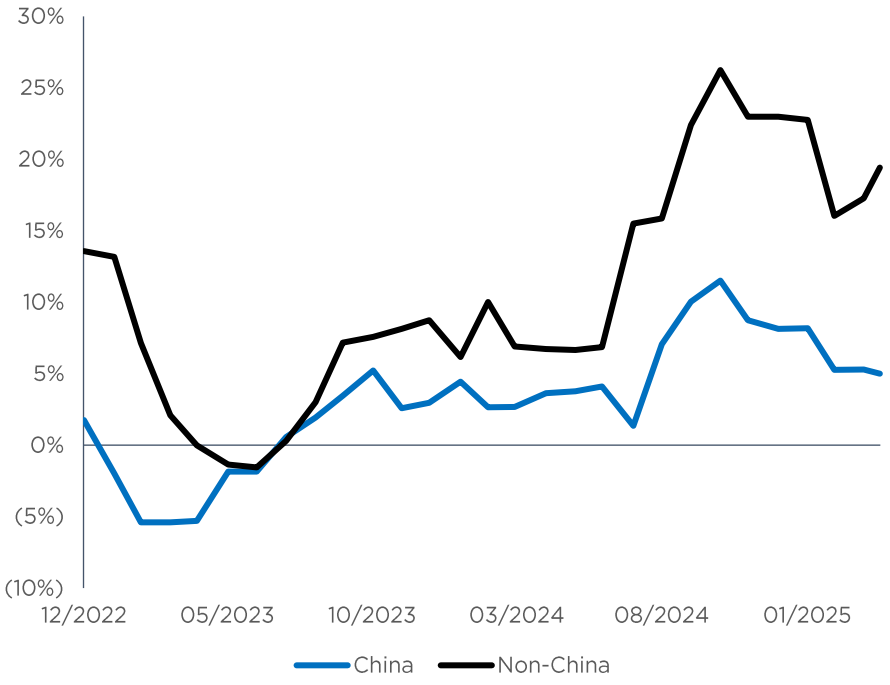
Ticker	Company	Report Date	Mentions	YTD Return
AMD	Advanced Micro Devices, Inc.	2025-02-04	0	(28%)
INTC	Intel Corporation	2025-01-30	0	(6%)
MRVL	Marvell Technology, Inc.	2025-03-05	0	(53%)
TER	Teradyne, Inc.	2025-01-30	0	(43%)
ALAB	Astera Labs, Inc.	2025-02-11	0	(55%)
MTSI	MACOM Technology Solutions	2025-02-06	0	(25%)
CRDO	Credo Technology Group	2025-03-04	0	(45%)
LSCC	Lattice Semiconductor	2025-02-10	0	(27%)
ONTO	Onto Innovation Inc.	2025-02-06	0	(31%)
RMBS	Rambus Inc.	2025-02-03	0	(14%)
SLAB	Silicon Laboratories Inc.	2025-02-04	0	(27%)
PI	Impinj, Inc.	2025-02-05	0	(53%)
PENG	Penguin Solutions, Inc.	2025-04-02	0	(17%)
SEDG	SolarEdge Technologies, Inc.	2025-02-19	0	(7%)
PDFS	PDF Solutions, Inc.	2025-02-13	0	(37%)
COHU	Cohu, Inc.	2025-02-14	0	(47%)
SKYT	SkyWater Technology,	2025-02-26	0	(52%)
BZAI	Blaize Holdings, Inc.	2025-03-27	0	(54%)
NVEC	NVE Corporation	2025-01-22	0	(29%)
LAES	SEALSQ Corp	2025-03-24	0	(10%)
VLN	Valens Semiconductor Ltd.	2025-02-26	0	(8%)

Source: Trivariate Research

STOCKS WITH CHINA MENTIONS PERFORM THE SAME AS THOSE W/O

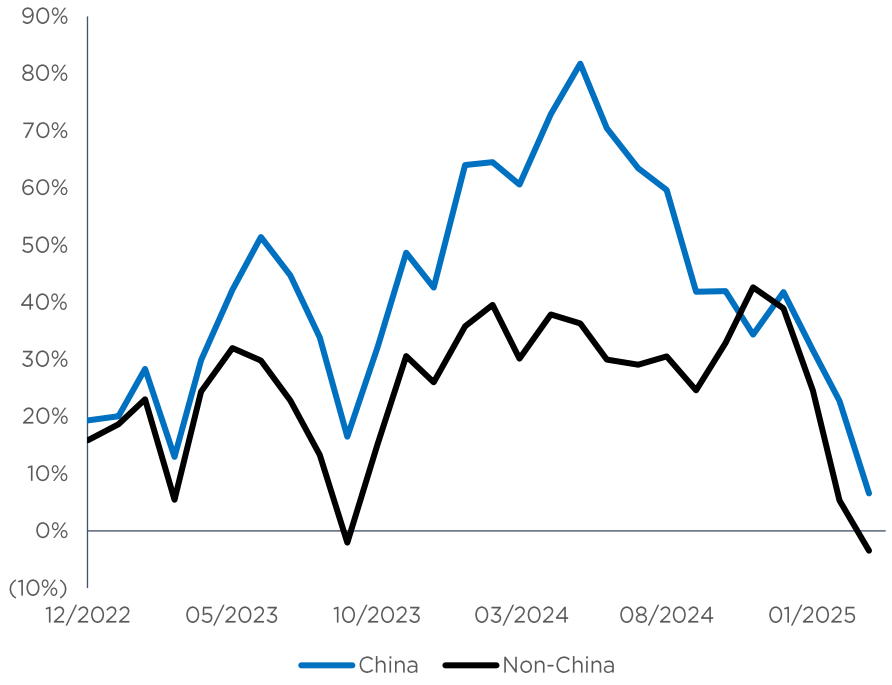
The forecasted revenue growth of the non-China Semiconductors (those with zero mentions) is higher than those with China exposure (left), but interestingly the stock performance, on an equally-weighted basis, of the stocks with more than 10 China mentions (the blue line) and those with zero (black line) are virtually the same now over the last 2.5 years (right).

Forecast Revenue Growth
China Semi vs Non-China Semi
Through April 17th, 2025



Source: Trivariate Research

Equal-Weight Cumulative Return
China Semi vs Non-China Semi
Through April 17th, 2025

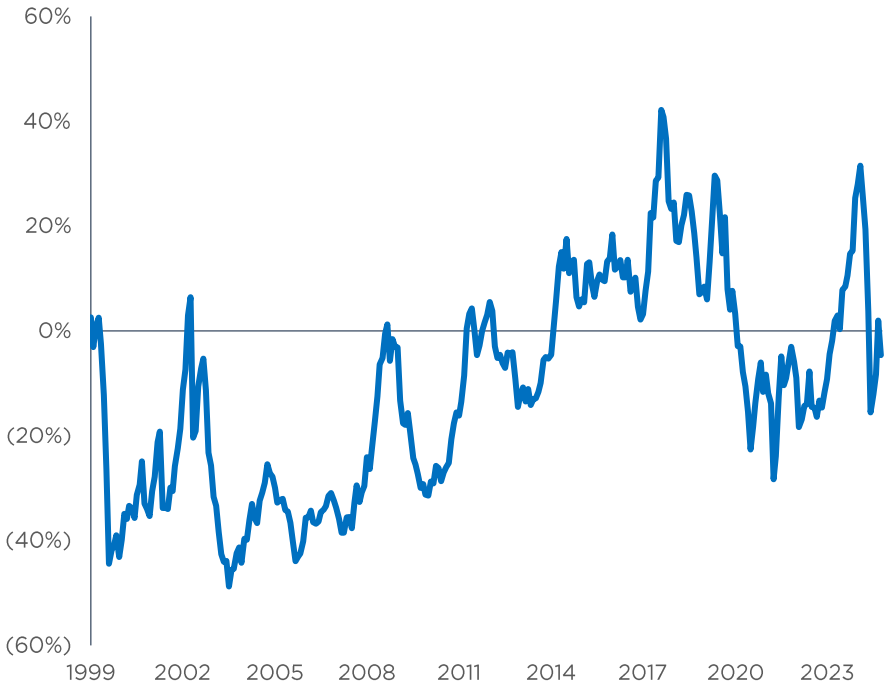


Source: Trivariate Research

USING VALUATION TO PICK STOCKS DOESN'T REALLY WORK

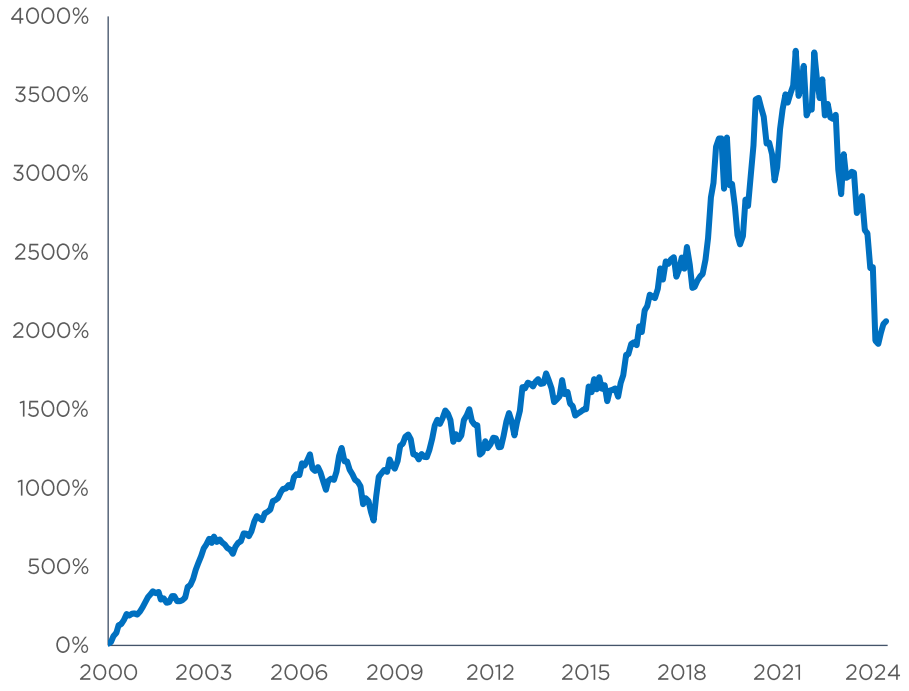
We are not convinced that investors that use valuation to pick Semiconductor stocks will have much success. We broke the semi universe into three equal-sized buckets and evaluated the efficacy of a strategy where we bought the top third of stocks that were cheap on free cash flow yield and shorted those that were expensive, rebalanced monthly (left). That strategy worked well from 2006 to 2017, but cumulatively from 1999-present has not made any money. Owning stocks that were cheap on enterprise-value-to-sales worked well from 2000 to 2022 but has failed miserably since (right).

Semiconductor Free Cash Flow Yield
Cumulative Return of T1 (High) - T3 (Low)
Through April 17th, 2025



Source: Trivariate Research

Semiconductor EV-to-Forecast Sales
Cumulative Return of T1 (Low) - T3 (High)
Through April 17th, 2025

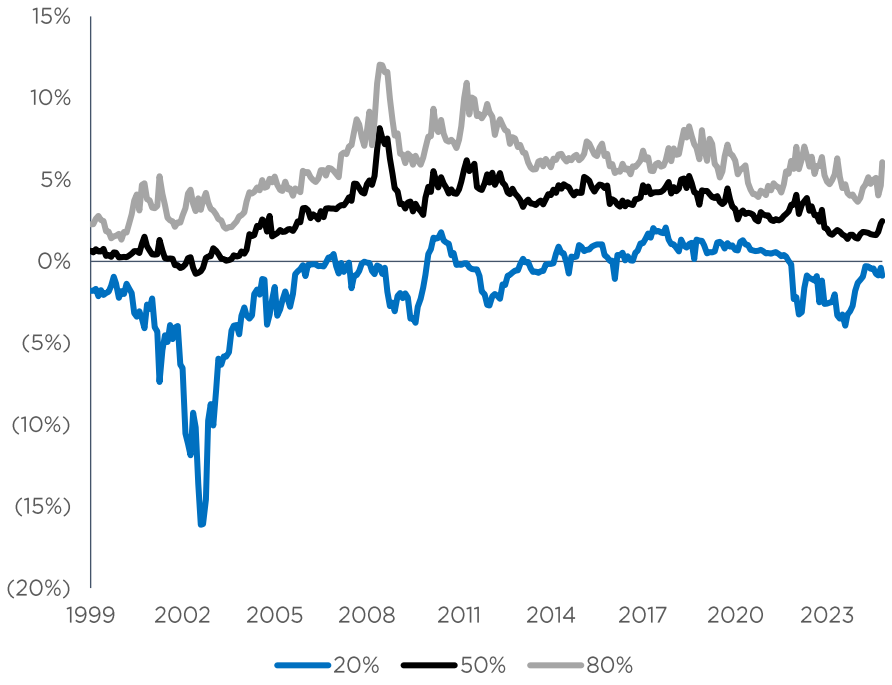


Source: Trivariate Research

FCF YIELDS AREN'T COMPELLING, EV-TO-FORECASTED SALES IS AVG.

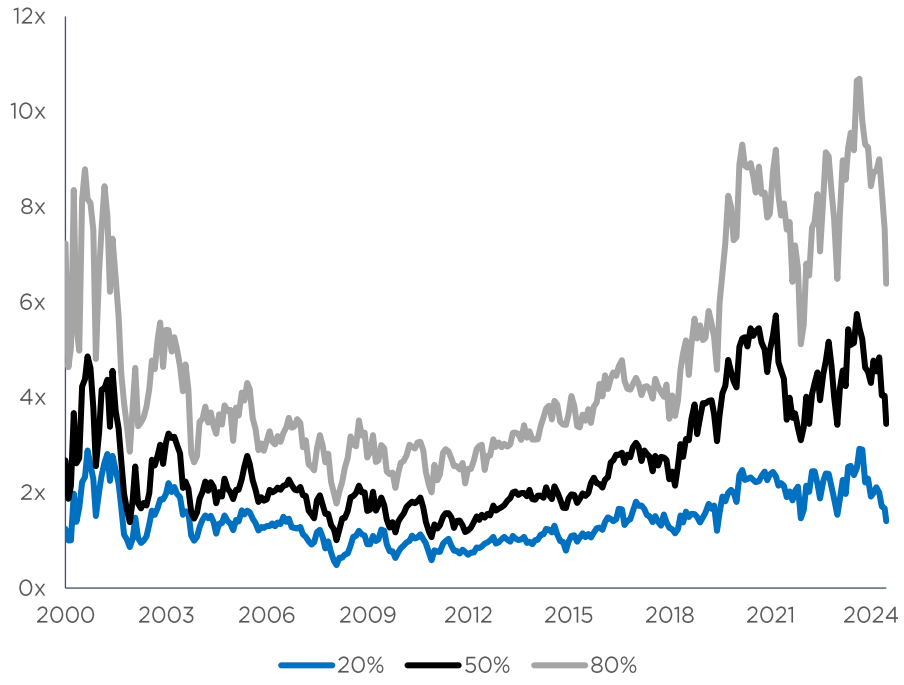
Despite the broad lack of efficacy in using valuation metrics to pick stocks, we wanted to provide some context on the distribution of valuation (20th, 50th, 80th percentile) for free cash flow yield (left) and enterprise-to-forecast sales (right). Just more than 20% of Semiconductors burn cash (left), and the median FCF yield of 2.5% isn't wildly attractive in absolute terms or relative to history despite the drawdown. On EV-to-forecasted sales, levels seem about in-line with 5-year averages across the distribution, though of course we think the sales forecasts are too high (right).

Semiconductor Free Cash Flow Yield
20th, 50th and 80th Percentile
Through April 17th, 2025



Source: Trivariate Research

Semiconductor EV-to-Forecast Sales
20th, 50th and 80th Percentile
Through April 17th, 2025



Source: Trivariate Research

VALUATION TABLE FOR THE LARGEST 20 SEMICONDUCTORS

We provide context on price-to-forward earnings, FCF yield, and EV-to-forecasted sales for the top 20 stocks by market cap. QCOM is cheap vs. its own history on price-to-forward earnings. Email us if you want more names.

Top 20 Semiconductor Stocks
As of April 17th, 2025

Ticker	Price-to-Forward Earnings	% vs. History	Free Cash Flow Yield	% vs. History	EV-to-Forecast Sales	% vs. History
NVDA	22.8x	44%	2%	52%	12.2x	79%
AVGO	25.9x	84%	3%	93%	13.8x	86%
QCOM	11.5x	8%	8%	2%	3.4x	17%
AMD	19.0x	17%	2%	15%	4.4x	78%
TXN	27.3x	75%	1%	85%	8.4x	84%
AMAT	14.7x	30%	5%	44%	3.8x	75%
ADI	24.8x	69%	4%	66%	9.0x	89%
KLAC	19.8x	62%	4%	65%	7.0x	91%
INTC	39.4x	91%	(19%)	100%	2.2x	16%
LRCX	16.6x	58%	5%	58%	4.4x	86%
MU	8.1x	18%	1%	50%	2.1x	66%
MRVL	18.5x	39%	3%	44%	5.9x	67%
NXPI	14.6x	55%	5%	57%	4.3x	60%
MPWR	31.2x	53%	3%	31%	9.2x	73%
MCHP	30.4x	83%	5%	68%	6.0x	67%
GFS	18.6x	3%	6%	3%	2.3x	0%
ON	13.9x	56%	8%	10%	2.6x	78%
FSLR	6.9x	7%	(2%)	57%	2.3x	62%
TER	21.6x	58%	4%	47%	3.7x	74%
ENTG	21.1x	59%	3%	57%	4.1x	77%

Source: Trivariate Research

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